

REMARKS

The Examiner has rejected the present application as being obvious based on US 4 695 380 (Hilgendorff et al.) in view of newly cited US 4 556 488 (Timm et al.).

It is noted that the Examiner's rejection is based on a newly cited reference and the Official Action should therefore not have been made final by the Examiner. Reconsideration of the finality of the Official Action is respectfully requested.

In view of the rejection of claim 1 of the present application as being obvious from the cited references, the subject matter of claim 2 has been included in claim 1 in order to distinguish the invention more clearly from the prior art applied by the Examiner.

Hilgendorff et al. (US 4 695 380) discloses a fluid treating apparatus with a plurality of membrane elements arranged in a stack extending along the axis of the apparatus within a housing having endplates and a central channel 4 extending through the stack from end plate 1 to end plate 2 for removing permeate from the apparatus. The end plates also include inlet and outlet openings 3 and 4 for conducting fluid to be treated through the apparatus.

The apparatus comprises a single stack of filter elements consisting of membrane pillows arranged in planes extending transverse to the longitudinal axis of the stack. The fluid to be treated is conducted in a meander-like pattern back and forth transverse to general fluid flow direction through the stack of filter elements. For an enlarging the apparatus presumably the stack of filter elements is increased.

Timm et al. (US 4 556 488) discloses an apparatus for filtering and separating liquid and gaseous media, particularly to a reverse osmosis water desalination apparatus including modules which are filled with membrane pillows and are open at opposite ends. The modules are arranged in an outer housing in longitudinal alignment. The membrane pillows all extend in planes parallel to the longitudinal axis of the apparatus. The modules are joined so that fluid to be treated can flow straight from the flow passages in one of the stacks to the respective flow passages in the next adjacent stack of membrane pillows, the flow passages providing for a parallel flow arrangement through the filter stacks and through the whole apparatus.

The Examiner states that Hilgendorff et al. ('380) discloses an apparatus for fluid separation apparatus with stacks of filter elements arranged in a series flow pattern through which fluid is conducted in a meander-like flow pattern and that Timm et al. teaches a plurality of stacks of pillow membranes arranged adjacent one another longitudinally in a pressure housing. While this is quite correct, this is also where the similarities end.

The present invention is also concerned with apparatus for the separation of flow media. It also includes membrane pillows which are arranged in spaced relationship in such a way that a meander-type fluid flow path is formed through which the fluid to be treated flows through the stack in a series flow arrangement. In the present case however stacks of membrane elements with meander-type serial flow passages are arranged adjacent one another longitudinally in the housing. In the arrangement according to the present invention, a stack of membrane pillows forming serpentine flow passages are disposed in separate compartments which are arranged adjacent one another in the longitudinal direction of apparatus and each stack is in the form of a closed space in which the membrane pillows are contained. Each closed space includes an inlet through which the fluid is conducted to the closed space and an outlet from which the fluid, after passing through the meander flow passages, is conducted to the inlet of the next closed space including a stack of membrane pillows forming serpentine or meander-type flow passages etc..., until, after passing through the last stack, the fluid is discharged through the outlet opening thereof.

The prior art does not disclose an arrangement wherein a plurality of stacks of membrane pillows with meander-type series flow passages are provided in the form of closed compartments disposed adjacent one another in the flow direction, nor is such an arrangement in any way suggested by any of the cited references.

Since the membrane elements forming the meander-type serial flow passages are arranged in separate compartments which are disposed adjacent one another in the longitudinal flow direction of the apparatus it is possible to exchange individual serial flow units for servicing cleaning or repair by replacing them with spare units in order to minimize down time. The apparatus according to the invention has therefore the advantages of the apparatus shown in Timm et al., while using meander-type flow passages which are preferred for certain applications. The references do not disclose apparatus with a plurality of

exchangeable meander-type flow units and the references do not suggest in any way apparatus with a plurality of meander-type flow units arranged in alignment next to one another in an apparatus with meander flow passages.

Claim 1 does not define the direction in which the membrane elements extend within each compartment. They may extend transverse or parallel to the general flow direction of the fluid through the apparatus as shown in Fig 1. Such an arrangement has additional advantages: Meander-like flow arrangements need flow reversal spaces at the ends of the units; and if the flow passages extend in the longitudinal direction, there are fewer flow reversal areas and longer flow passages. And this does not only saves space, but also reduces pressure losses of the fluid flowing through the apparatus.

A combination of Timm et al. and Hilgendorff et al. would not result in the arrangement according to the present invention. since nowhere is there a suggestion that the meander-type flow passages could be arranged in separate units arranged adjacent one another in the longitudinal direction of the apparatus.

In this connection, it is noted that:

“ Contrary to the position taken by the Examiner in determining the patentability of an invention, it should be recognized that the fact that the prior art could be modified in an Examiner's view so as to result in the combination defined by the claims at bar would not have made the modification obvious unless the prior art suggests the desirability of the modification.” See In re Deminski, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986).

Furthermore, In re Laskowski, CAFC, No. 88-1349, decided April 3, 1989, concerning an invention utilizing, for the support of a saw band, a loose tire rather than a tightly fitted tire, the Court stated that, although the Commissioner suggests that Hoffman (the cited prior art utilizing a tightly fitted tire) could readily be modified to form the Laskowski structure (with loosely fitted tire), the mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.

Since none of the references suggest or provides any hint that in a fluid separation apparatus meander-type flow passages could be disposed in several units arranged adjacent

one another in the longitudinal direction of the apparatus, it can hardly be said credibly that the present invention was obvious from the references applied by the Examiner.

Reconsideration of the Examiner's rejection of claim 1 as amended is respectfully requested.

The remaining claims 3 to 15 are directed to particular advantageous features of the apparatus according to the invention. They are all directly or indirectly dependent on claim 1, and consequently, include all the features of claim 1. They should therefore be considered to be patentable together with claim 1 already for that reason.

Reconsideration of claims 3 to 15 and allowance of claim 1 and 3 to 15 is solicited.

Respectfully submitted,

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